

Name: \_\_\_\_\_

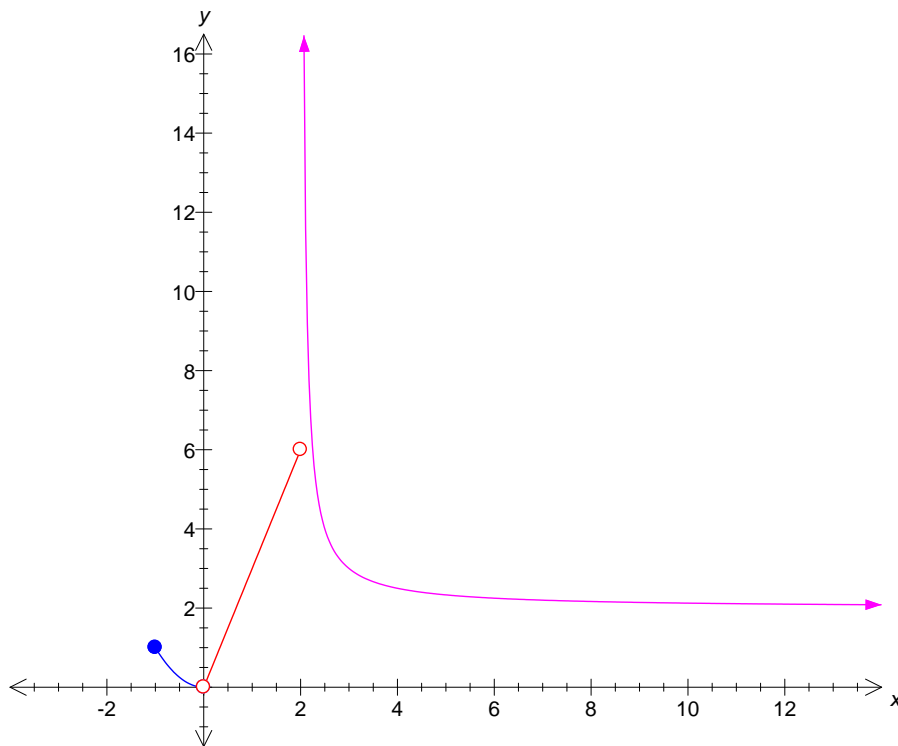
Period : \_\_\_\_

Due Date: \_\_\_\_\_

**AP Calculus AB/BC – Problem Set #1 - Limits**

- 1.) Evaluate  $\lim_{x \rightarrow 0} f(x)$  for the function  $f(x) = \frac{\sin(x)}{x}$  numerically by using a T-Chart (**Make sure that you use radians!!!**). State the limit and justify your answer using the one-sided limits.

Use the function below to answer questions 2 – 9.



2.)  $\lim_{x \rightarrow 0^-} f(x) =$

3.)  $\lim_{x \rightarrow 0^+} f(x) =$

4.)  $\lim_{x \rightarrow 0} f(x) =$

5.)  $f(0) =$

6.)  $\lim_{x \rightarrow 2^-} f(x) =$

7.)  $\lim_{x \rightarrow 2^+} f(x) =$

8.)  $\lim_{x \rightarrow 2} f(x) =$

9.)  $f(2) =$

$$f(x) = \begin{cases} x^2; & -1 \leq x < 0 \\ 3x; & 0 \leq x < 2 \\ \frac{1}{x-2} + 2; & 2 < x < \infty \end{cases}$$

For #'s 10 – 13, determine if the limit exists and, if it does, evaluate it **algebraically**. If the limit does not exist, **explain** how you know.

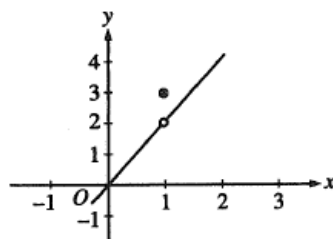
10.)  $\lim_{x \rightarrow 5} \frac{x^2 - 7x + 10}{x - 5}$

11.)  $\lim_{x \rightarrow 25} \frac{\sqrt{x} - 5}{x - 25}$

12.)  $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$

13.)  $\lim_{x \rightarrow 5} \frac{7}{x - 5}$

AP Questions on Limits – For each question, select the best answer and **explain your reasoning**.



Graph of  $f$

81. The graph of the function  $f$  is shown in the figure above. The value of  $\lim_{x \rightarrow 1} \sin(f(x))$  is

- (A) 0.909      (B) 0.841      (C) 0.141      (D) -0.416      (E) nonexistent

14.)

12. If  $f(x) = \begin{cases} \ln x & \text{for } 0 < x \leq 2 \\ x^2 \ln 2 & \text{for } 2 < x \leq 4 \end{cases}$ , then  $\lim_{x \rightarrow 2} f(x)$  is

- (A)  $\ln 2$       (B)  $\ln 8$       (C)  $\ln 16$       (D) 4      (E) nonexistent

15.)